

MITES ASSOCIATED WITH BEES IN JAMMU AND KASHMIR, INDIA

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Jammu and Kashmir, the northern most state of India with the climate subtropical in Jammu and temperate in Kashmir. The local population is basically farmers who have been practicing bee keeping with the local species, i.e. *Apis cerana indica*. Modernization of agriculture has led some bee keepers to adopt the European species of honey bee *A. mellifera*. The role of solitary bees /non *Apis* bees as efficient pollinators is being realized lately. This paper presents the mites associated with bees in the state of Jammu and Kashmir.

The mites encountered on different bees are presented in Table 1. The bee mite, *Varroa jacobsoni*, first described by Oudemans (1904a,b) is presently the most important enemy of bee keeping industry throughout the world including developed and underdeveloped countries (Percy & Kshirsagar, 1964; Delfinado & Baker 1974; Harnaj, 1977; Griffith & Bowman 1981; Dejong *et al.*, 1982; Kapil & Putatunda, 1983; Ritter, 1986; Tibor, 1988; Putatunda, 1996; Bobhor, 1998; Erickson *et al.*, 1998; Putatunda *et al.*, 2001).

The mite *Euvarroa sinhai* was originally described by Delfinado and Baker from India in 1974 on *Apis florea* and then was recorded extensively in Haryana State mainly on *A. florea* and later on *A. mellifera* (Bhaskar & Putatunda, 1989; Putatunda 1996) and from Jammu & Kashmir (Abrol & Putatunda, 1995). This mite will be a great cause of concern to the bee keeping industry if it adopts *A. mellifera* as its host.

The mite *Tropilaelaps clareae* was described by Delfinado and Baker in 1961. Presently, it is considered as the second enemy of bee keeping in different parts of the globe including most states in India (Abrol & Putatunda, 1995, 1996; Koeniger *et al.*, 1983), but is the most important threat to bees in Haryana and Punjab (Bhaskar & Putatunda, 1989; Putatunda, 1996). The mite has been recorded from J & K by Abrol and Putatunda (1995).

As this mite is much faster in movement and has adapted to all the five species of honey bees (*Apis cerana*, *A. dorsata*, *A. florea*, *A. laboriosa* and *A. mellifera*), there is a chance that this mite will outnumber *Varroa jacobsoni* with the passage of time.

T. koenigerum was originally described by Delfinado-Baker and Baker in 1982 from Sri Lanka on *Apis dorsata*. Later on, the mite was recorded as a parasite of *Apis dorsata* and *A. laboriosa* in Nepal by Delfinado-Baker *et al.* in 1985. In India, this mite is known from Jammu and Kashmir from *A. dorsata*, *A. cerana* and *A. mellifera* (Abrol & Putatunda, 1995).

The mite *Neocypholaelaps indica* Evans 1963, is known in India from the states of Karnataka, Kerala and Tamil Nadu on *Apis cerana* and Eucalyptus flowers. *Neocypholaelaps* spp. of mites are basically phoretic that are not parasites of bees (Percy *et al.* 1968; Putatunda, 1996; Ramanan & Ghal, 1984) but they affect the normal pollen and nectar collecting capacity of bees. According to Delfinado-Baker and Baker (1983), and Baker and Delfinado-Baker (1985), seven species of mites of the genus *Neocypholaelaps*, namely *N. africana* Evans, *N. amphullula* (Berlese), *N. apicola* Delfinado-Baker and Baker, *N. favus* Ishikawa, *N. indica* Evans, *N. novaehollandiae* Evans and *N. phooni* Baker and Delfinado-Baker are associated with honey bees. Among these mites, *N. indica* is known from India, China, Nepal and Sri Lanka and *N. apicola* from Pakistan. The mite *N. indica* has been recorded from Jammu and Kashmir from *Apis cerana*, *A. mellifera*, *A. dorsata* and *A. florea* (Abrol & Putatunda, 1995).

Prostigmatid mites have not been observed from Jammu and Kashmir though a good number of them have been described and recorded from Haryana (Baker & Delfinado, 1975; Putatunda & Kapil, 1988; Putatunda, 1996).

In the present study, among the Astigmatid mites, *Carpoglyphus lactis* (Linn.), *Tyrophagus longior* (Gervais) and *T. tropicus* Robertson, were found in different life stages (Larva/nymph/adult) whereas all other species were encountered in the hypopeal or non-feeding phoretic conditions. Acarid hypopial stages are known to attach themselves to insects (Krantz, 1972). According to Prasad (1974), none of the Astigmatid mites are reported to be associated with bees in India. However, on review of bee mites of India, Putatunda (1996) indicated a large number of Astigmatid mites associated with bees in India.

The mite *Carpoglyphus lactis* (Linn.) is well known from food substances specially having sugars, dried fruits, rotten potatoes, fruits, pollen and even in honey combs of *Apis* spp. of bees and is considered as an important contaminant of honey (Baker & Delfinado, 1978; Hughes, 1976; Krantz, 1972) in different parts of the world. In India, *C. lactis* was first recorded by Kapil *et al.* (1985) on *Ceratina* sp. of bees.

Table 1. Bee mites of Jammu & Kashmir

Locality Mite/Bee	J&K Apis cerana indica	J&K A. dorsata	J&K A. floreae	J&K A. mellifera	Only Bombus sp.	Only Kashmir Bumble	Only Kashmir Xylocopa sp.	J&K Xylocopa sp.	J&K Megachilid sp.	J&K Solitary bee	Reference
Astigmata											
Acaridae											
Hypopus (P) (N)		+			+				+		
Kuzinia evae (P) (N)					+				+		
Kuzinia sp. (P) (N)		+									
Tyrophagus longior (PSF)	+	+	+	+							Abrol et al., 1994
Tyrophagus tropicus (PSF) (N)	+	+	+	+							
Carpoglyphidae											
Carpoglyphus lactis (PSF) (N)	+										
Chaetodactylidae											
Sennertia sp. (P) (N)	+	+			+						
Saproglyphidae											
Schulzea sp. new-I (P) (N)					+						
Vidia sp. new-I (P) (N)	+	+									
Mesostigmata											
Ameroseiidae											
Neocypholaelaps indica (P)	+	+									Abrol & Putatunda, 1995
Neocypholaelaps sp. new-I (P) (N)	+										
Delfinadoideae											
Delfinado sp. (E.P) (N)								+			
Laelapidae (N)											
Tropilaelaps clareae (EP)	+	+									Abrol & Putatunda, 1995
Tropilaelaps koenigerum (EP)	+	+									Abrol & Putatunda, 1995
Phytoseiidae Varroidae											
Euvarroa sinhai (EP)					+						Abrol & Putatunda, 1995
Varroa jacobsoni (EP)	+										Abrol & Putatunda, 1995

+ = Positive, M = Moderate infestation, H = High infestation, P = Phoretic, EP = Ectoparasite, PSF = Pest of stored (Pollen/honey) food, N = New record for J & K state

The mite *Kuzinia evae* was originally described by Putatunda *et al.* in 1983 from *Pithitis* sp. of bees and *K. woykei* the second species from India (Himachal Pradesh) on bumble bee. Prior to this, Delfinado and Baker (1976) described three new species of which *K. dispar* was based on an Indian material (the host being bumble bee).

In India, four species of *Schulzeia* mite have been described as new species from non-*Apis* sp. of bees. *S. zakhvatkini* was described by Delfinado and Baker (1976) and other three, *S. indica*, *S. orientalis* and *S. halicti* by Putatunda and Kapil (1995).

The mite *Tyrophagus longior* (Gervais) was observed by Abrol *et al.* (1994) on bee hives of *Apis cerana* and *Apis mellifera* in Jammu and Kashmir State. According to Hughes (1976), *T. longior* is reported from nest of birds (sparrow) in Poland and in Poultry bed (droppings). According to Prasad (1974), *T. longior* and *T. putrescentia* (Schränk) are known from India mainly from decaying materials, store products, soil and in association with insects. According to De Jong *et al.* (1982) *T. longior* is known to be associated with honeybees (*Apis* sp.).

The mite *Tyrophagus tropicus* Robertson (1959) is being recorded here from all the four honey bee species namely *Apis cerana*, *A. dorsata*, *A. florea* and *A. mellifera* from Jammu and Kashmir. This mite, *T. tropicus* is known to infest stored products like copra, rice, tobacco, palm kernel, dust (Hughes, 1976) in USA, England, Ghana, Nigeria and in several other countries. This appears to be the first record of the mite from Asia. A related species *T. similis* Volgin is known to infest *A. dorsata* in Haryana in India (Putatunda, 1996).

T. longior is known as causal agent of human intestinal and urogenital acariasis and that *Tyrophagus* sp. of mites may cause contact dermatitis to individuals who handle contaminated materials (Baker & Wharton, 1952; Krantz, 1972).

Sennertia sp. of mites are well known to be associated with non *Apis* species of bees in the world (Fain, 1981; Krantz, 1972) and that 28 species have been reported from India (Putatunda, 1996; Putatunda & Kapil, 1990). Baker and Delfinado-Baker (1983) for the first time reported the association of *Sennertia* mites with *Apis mellifera* from Guatemala.

Vidia sp. are known to be associated with bees and wasps (Baker, 1964; Delfinado & Baker, 1976; Krantz, 1972) from different parts of the globe and from India it is known from *Megachile flavipes* from Haryana (Putatunda, 1996).

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